



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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MAY 14 2003

Ref: 8P-AR

Mr. Terry O'Clair  
North Dakota Department of Health  
P.O. Box 5520  
Bismarck, ND 58504

Dear Mr. O'Clair,

Thank you for participating in the meeting with Basin Electric, their consultant (ENSR), and counsel in the May 2, 2003 presentation at EPA offices concerning their modeling findings on the North Dakota PSD increment issue. Subsequently you have asked us to provide our initial reactions to Basin's presentation. In this letter we are providing some comments and observations, however, we cannot provide comprehensive comments without reviewing the all the materials and data referenced in ENSR's presentation. We have just received the additional 50 compact disks from Basin's attorneys and will provide additional comments as necessary.

In essence, Basin Electric is proposing to adapt for use in air pollution modeling a methodology similar to that used by the National Weather Service in assimilating weather data and making short-term weather forecasts. Conceptually, this technique may offer the ability to supplement the existing data sets used in air pollution modeling. We would like to note, however, that EPA and the states are not currently using this type of data for regulatory modeling purposes since this is relatively new technology, and the modeling and regulatory communities have not yet addressed a number of fundamental regulatory issues. For example, the quality and accuracy of the Rapid Update Cycle version 2 (RUC2) data compared to data from conventional sources, the quantity and representativeness of data that this technique actually provides for modeling input (much of the aircraft and NEXRAD wind information are not continuously available), and the compatibility of using spatially averaged RUC2 data in modeling systems that were developed to use data from conventional sources such as FAA, military observations, balloon soundings, etc. We also note that in cover letters from Basin's staff counsel transmitting data to EPA, Basin asserts that the data and software to process the RUC2 data is confidential business information and may not be disclosed. These compact disks contain hourly meteorological input files in MM5 format, utilized by ENSR in performing the modeling. This would not be acceptable for regulatory modeling purposes, since under EPA regulations models/data must be in the public domain.



We have conducted a preliminary review of ENSR's March 2003 report entitled "Revised Calpuff Analysis with Year 2000 MM5 Meteorological Data." This analysis formed the basis for ENSR's assertion at the May 2 meeting that there were no PSD increment violations using year 2000 RUC2 data and EPA's modeling approach, attributing the reduced PSD increment concentrations to the use of RUC2 meteorology data. Our review of ENSR's report indicates that most of the difference in results between EPA's approach and ENSR's is related to differences in emissions inputs, not meteorology.

First, we noted that the emission rate inputs, shown in Table 4-1 of ENSR's report are different than the emission rates EPA used for the baseline years of 1976-1977. It appears the contractor relied on NDDH's baseline emission rates that were used in the State's draft April 2002 modeling study. EPA commented on this emission rate discrepancy to North Dakota during the May 2002 State hearing on the PSD increment issue. We believe that the baseline emission rate values used by North Dakota are inappropriate. To estimate the overall differences in emissions between the two approaches, EPA calculated SO<sub>2</sub> increment consuming emissions from the information provided in Table 4.1, then compared them with values EPA is using in its May 2003 modeling analysis, which will be released later this month. The results are shown in the enclosed table. Overall it appears that ENSR's modeling underestimated increment consuming emissions by about 14,900 pounds/hour, which is about 45 percent of the total increment consuming emissions used in EPA's modeling. If the correct increment consuming emissions would have been input in ENSR's modeling analysis, increment violations likely may have been predicted using year 2000 RUC2 meteorology.

Second, NDDH's baseline emissions estimates are much higher than EPA's because of differences in methodology. The fundamental regulatory requirement is to determine emissions as they actually occurred in the 1976-1977 baseline period. In a number of instances the State has used later years beyond the 1976 - 1977 window which appears to result in higher baseline emissions. For example, in calculating power plant emissions the State uses a weighted average of coal sulfur content over the life of the mine rather than the sulfur content of coal actually used during the 1976 and 1977 baseline period. Use of life-of-mine coal sulfur data increases base year emissions by about 11,000 tons/year. Another aspect of the State's baseline inventory approach considers anticipated production rate increases to be applicable even in cases where actual source emissions are well documented for the 1976-1977 period. In the case of the Royal Oak facility the anticipated expansion added 7,200 tons to the State's baseline inventory, even though expansion plans did not affect actual emissions during 1976-1977.

Third, to further examine the differences between the two modeling approaches EPA and Fish and Wildlife Service (FWS) performed sensitivity tests looking at the differences in modeling results with and without MM5 data. For year 2000 the same emissions and regulatory default model settings were used in both sensitivity tests. One test used the standard meteorological data sets and the other used the standard meteorological data plus the RUC2

analysis provided by ENSR. The year 2000 results are shown in the enclosed figures. From figures 1 and 2 it can be seen that use of the 2000 RUC2-MM5 data did not significantly change the predicted high second high concentration, in fact at TRNP-South Unit it appears that the design concentration actually increased. Figures 3 and 4 show the predicted number of days in year 2000 that the 5 ug/m3 PSD increment was exceeded. Again, it can be seen that very little changed with incorporation of the RUC2 data into the analysis. These results are also consistent with sensitivity tests EPA conducted on the 1990, 1992 and 1994 data sets to determine the effect of using MM4/5 data. Generally, the use of MM4 and MM5 data does not significantly change predicted concentrations. This is consistent with what would be expected in a modeling domain with relatively flat terrain and a fairly robust input data set of surface and upper air weather observations, as is the case with this modeling domain.

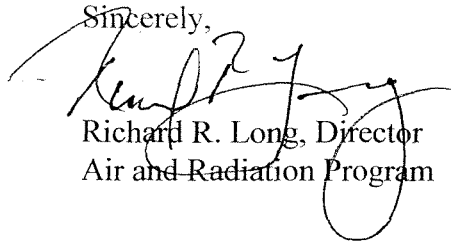
Fourth, for other areas in ENSR's presentation and report where differences from EPA's approach are identified, we wanted to point out that we have included increment expanding sources in the modeling analysis we will release later this month for comment. These increment expanding sources include oil and gas sources and the Mandan refinery. The ENSR report acknowledged that variance sources are not accounted for in the ENSR study. These sources emit nearly 12,000 tons/year of increment consuming emissions that EPA believes should be included in ENSR's modeling, as discussed in EPA's comments to the State in May 2002.

Fifth, in the limited model evaluation effort described in the ENSR report, an unmodeled background concentration of 2 ug/m3 was added to the modeled predictions. EPA believes that this value is excessive, and use of a background value of this magnitude would tend to mask modeled underpredictions. The January 2002 modeling evaluation study referenced in EPA's draft study assumed negligible background concentrations. This is appropriate because all major SO2 sources within 250 km, including large Canadian sources, were already included in the Calpuff evaluation runs. To include them again would, in effect, be double-counting emissions. At our May 2, 2003 meeting ENSR mentioned other SO2 sources not accounted for in the model evaluation study such as peat bogs, and motor vehicle emissions from I-94, would justify a background value as high as 2 ug/m3. The CO emission rate from motor vehicles is more than 500 times larger than the SO2 emission rate and CO concentrations have never been an issue at TRNP. The limited amount of traffic and distance to the monitoring site would make any SO2 contributions from vehicles extremely small. High resolution SO2 monitoring data from areas remote from traditional SO2 sources (i.e., power plants, oil and gas sources, etc), and data from scientific literature indicates background values of near zero.

As you know EPA has just completed a thorough analysis of PSD increment consumption in North Dakota using the required regulatory approach, and we will be issuing a report on the result shortly. A significant portion of the re-analysis efforts was directed at responding to Basins/ENSR's comments at the May 2002 public hearing in Bismarck, and provides more detailed information on a number of the issues discussed above.

Again, thank you for your participation in these discussions. If you have any questions or comments on the above please call me at (303) 312-6005.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard R. Long", is written over the typed name and title.

Richard R. Long, Director  
Air and Radiation Program

Enclosures

cc: C. Shaver, NPS  
D. Levchak, Basin

**SO<sub>2</sub> INCREMENT INVENTORY FOR LARGEST ND BASELINE SOURCES**

Source	Base Year Emissions		Current Year Emissions		Increment Consuming Emissions	
	EPA [lb/hr]	ENSR [lb/hr]	EPA [lb/hr]	ENSR [lb/hr]	EPA [lb/hr]	ENSR [lb/hr]
<b>Minnkota Power Cooperative - Milton R. Young Station</b>						
Unit 1	3,972	5,682	6,087	5,914	2,115	232
Unit 2	5,634	5,442	5,749	4,843	115	(599)
<b>Basin Electric Power Cooperative - Leland Olds Station</b>						
Unit 1	2,714	4,675	5,085	4,896	2,371	221
Unit 2	4,185	9,843	10,354	10,401	6,169	558
<b>Montana Dakota Utilities Co. - Heskett Station</b>						
Unit 1	589	659	342	349	(247)	(310)
Unit 2	1,625	1,441	849	811	(776)	(630)
<b>Great River Energy - Stanton Station</b>						
Unit 1	2,359	3,047	2,669	2,930	310	(117)
Unit 10	n/a	n/a	316	0	316	0
<b>Dakota Gasification Plant</b>						
Greatplain Synfuels	n/a	n/a	2,604	0	2,604	0
<b>Other Inc Expansion sources</b>						
Royal Oak	545	1,764			(545)	(1,764)
Mandan Refinery	2,372	2,484	1,210	1,263	(1,162)	(1,221)
<b>TOTAL</b>	<b>23,995</b>	<b>35,037</b>	<b>35,265</b>	<b>31,407</b>	<b>11,270</b>	<b>(-3630)</b>

Net increment consuming emissions for all sources (both increment expanding and consuming) in EPA-final modeling study was 27, 250 lbs/hour. For the baseline sources shown above, ENSR (Basin's consultant) underestimated increment consuming emissions by 14900 lbs/hr (the difference between 11270 and -3630). For the PSD sources built after 1979, where baseline emissions are not an issue, both EPA and ENSR used similar emissions. Oil and gas emissions estimates also appeared to be similar. Based on these apparent differences in emissions, ENSR would have input about 12,350 lbs/hr of net increment consuming emissions into their RUC modeling which is 45% of the amount used in the final EPA modeling.